REPLACED BY ART 34 AMDT

## CLAIMS

What is claimed is:

1. A machine tool comprising at least one linear axis, and at least a rotation axis, the at least rotation axis being controllable to move to a specified position in sequential or simultaneous synchronization with a movement of the at least one linear axis, and a toolholder mounted to a tool rest, the toolholder including a cutting tool defining a critical angle with respect to a workpiece, wherein the critical angle is selectively determined as a vector of movement of the at least one linear axis is changed.

2. The machine tool according to Claim 1, wherein the critical angle is one of a lead angle, a trailing angle, a rake angle and a flank clearance angle.

3. The machine tool according to Claim 2, wherein the rake angle is corrected by positioning the cutting tool using the at least one linear axis and the rotation axis.

4. The machine tool according to Claim 2, further comprising a rotary axis, wherein the rake angle is corrected by positioning the cutting tool using the at least one linear axis and the rotary axis.

5. The machine tool according to Claim 1, wherein the cutting tool defines a first trailing angle during a roughing pass and a second trailing angle during a finishing pass, the second trailing angle being different than the first trailing angle.

6. The machine tool according to Claim 1, wherein the cutting tool includes a cutting tool nose radius that is substantially concentric with a longitudinal axis of the toolholder.

7. The machine tool according to Claim 1, wherein the cutting tool is positioned on one side of a centerline of the workpiece when the workpiece rotates in a first direction, and wherein the cutting tool is positioned on an opposite side of the centerline of the workpiece when the workpiece rotates in a second, opposite direction.

8. The machine tool according to Claim 1, wherein a lead angle of the cutting tool is used to anticipate interference between the cutting tool and the workpiece.

9. The machine tool according to Claim 1, wherein a clearance angle of the cutting tool is adjusted with respect to a geometry of the workpiece.

10. The machine tool according to Claim 1, wherein a lead angle of the cutting tool is adjusted with respect to a geometry of the workpiece.

11. The machine tool according to Claim 1, wherein a rake face of the cutting tool is substantially perpendicular to a longitudinal axis of the toolholder.

12. A machine tool comprising at least three axes of linear motion, and at least a rotation axis, the at least one rotation axis being controllable to move to a specified position in synchronization with a movement of one of the at least three axes of linear motion, and a toolholder mounted to a tool rest, the toolholder including a cutting tool defining a lead angle with respect to a workpiece, wherein the lead angle is selectively determined by controlling the rotary axis to move to a specified portion of the workpiece at a specified velocity in synchronization with a movement of one of the at least three axes of linear motion.

13. The machine tool according to Claim 12, the machine tool back calculates the specific velocity for each linear axis to reach the specific portion of the workpiece at a specified point in time.

14. A controllable toolholder, the toolholder being mounted in a tool rest of a machine tool comprising at least three axes of linear motion, and at least a rotation axis, the at least one rotation axis being controllable to move to a specified position in synchronization with a movement of one of the at least three axes of linear motion, the toolholder comprising:

a tool spindle for retaining the toolholder in a tool rest;

an adaptor for supporting a cutting tool retained in the adaptor by a clamp, the cutting tool defining a critical angle,

wherein the critical angle is corrected as a vector of movement of at least one of the linear axis is changed.

15. The toolholder according to Claim 14, wherein the critical angle is one of a lead angle, a trailing angle, a rake angle and a flank clearance angle.

16. The toolholder according to Claim 15, wherein the rake angle is corrected by positioning the cutting tool using two axes of linear motion and the rotation axis.

17. The toolholder according to Claim 15, wherein the rake angle is corrected by positioning the cutting tool using three axes of linear motion and the rotary axis.

18. The toolholder according to Claim 14, wherein the cutting tool defines a first trailing angle during a roughing pass and a second trailing angle during a finishing pass, the second trailing angle being different than the first trailing angle.

19. The toolholder according to Claim 14, wherein the cutting tool includes a cutting tool nose radius that is substantially concentric with a longitudinal axis of the toolholder.

20. The toolholder according to Claim 14, wherein the cutting tool is positioned on one side of a centerline of the workpiece when the workpiece rotates in a first direction, and wherein the cutting tool is positioned on an opposite side of the centerline of the workpiece when the workpiece rotates in a second, opposite direction.

21. A method of controlling a machine tool, the machine tool comprising at least three axes of linear motion, one of a rotary axis and a rotation axis, and a toolholder mounted to a tool rest, the toolholder including a cutting tool defining a critical angle with respect to a workpiece, the method comprising the steps of:

moving one of the rotary axis and rotation axis to a specified position in synchronization with a movement of one of the at least three axes of linear motion,

correcting the critical angle as a vector of movement of at least one of the linear axis is changed.

22. A method of controlling a toolholder with a cutting tool, comprising the steps of:

reversing a direction of rotation of a workpiece, and

positioning the cutting tool on opposite side of a centerline of rotation of the workpiece.

23. A method of controlling a machine tool comprising at least three axes of linear motion, one of a rotary axis and a rotation axis, and a toolholder mounted to a tool rest, the toolholder including a cutting tool, the method comprising the steps of providing a macro including a geometry of a workpiece to be machined and a geometric relationship of the cutting tool with respect to the workpiece, whereby the macro calculates the required movements of the at least three axes of linear motion, and one of the rotary axis and rotation axis required to maintain a specified cutting tool geometry as the cutting tool proceeds across a surface of the workpiece.

24. The method according to Claim 23, whereby the macro calculates a velocity of the cutting tool for each axis.

25. A toolholder comprising a tool shank for retaining the toolholder in a tool rest, the toolholder including an adaptor for supporting a cutting tool which is attached to the adaptor, wherein the rake face of the cutting tool is substantially perpendicular to a longitudinal axis of the toolholder.

26. The toolholder of Claim 25 wherein the cutting tool includes a cutting tool nose radius that is substantially concentric with the longitudinal axis of the toolholder.